THERMO CATALYTIC SYSTEMS LTD

Works &Test Centre :
Unit 1B
Brown Lees Road Industrial Estate
Forge Way
Knypersley
Stoke-on-Trent
England ST8 7DN

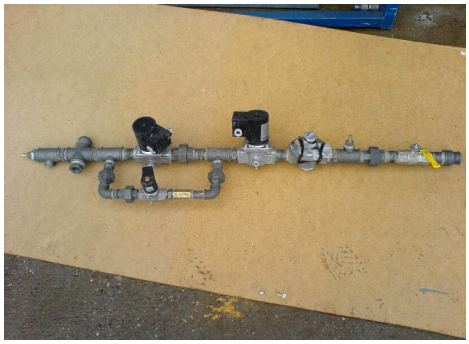
Dublin Office:
4 Glasnevin Drive
Glasnevin
Dublin 11
Ireland

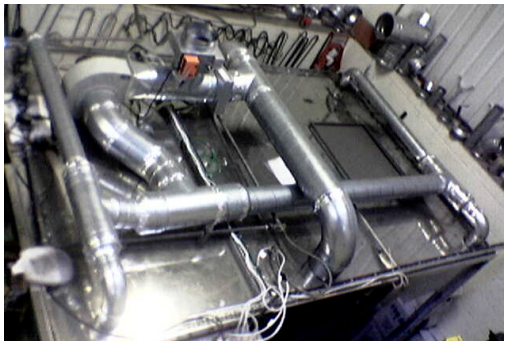
Ph : + 44 (0) 1782 511880
Fax: + 44 (0) 1538 755166
www.thermocatalytic.com
e-mail : thermocatsys@aol.com
Ph : + 353 (0) 1 8422840
Fax: + 353 (0) 1 8422422

Bruest ATEX Certified Flameless Gas Catalytic Heaters – Industrial Oven Systems

01/01/09

SPECIFICATION : "CATBOX CONVERSION" SYSTEM (FOR USE WITH CUSTOMER'S OWN ENCLOSURE)





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(FOR PRICES PLEASE SEE SEPARATE PRICE LIST)

Supply only of components for a thermocatalytic "CATBOX CONVERSION" curing system using **British Gas recommended Bruest** thermocatalytic heaters. (It is envisaged that the customer will make their own curing enclosure/area and suitably insulate it (e.g. with foam filled foil-backed sandwich board).

PART 1: HEATERS

Two off **British Gas recommended**, Bruest flameless gas thermo-catalytic infrared emitters, **ATEX Certified as Category 2 equipment for use in Zone 1** (and Zone 2) potentially explosive atmospheres.

The heaters will be manufactured in stainless steel for corrosion resistance in keeping with the current standards(IGE/UP/12) from the Institute of Gas Engineers & Managers, section 12.4.1.

Each heater will be complete with a protective face grill, made in *stainless steel,* to I.P. 20 **("finger-proof")** to prevent personnel from touching the hot surface of the face of the heater.

The catalyst pads within the heaters are **guaranteed for 5 years**

The heaters will contain pre-heating elements of: 240 v (other voltages are available). The heaters will be jetted for Natural (mains) Gas or Propane (bottled/tank) gas as required***. Please specify fuel***

Each heater will measure approx.12"x72" (305mm x 1,829mm approx.) rated at be **36,000 Btus. (10.5Kw**

Note: The heat output mentioned above is for a room or enclosure approx. 3-m long x 2-m wide x 2-m tall. Larger rooms/enclosures may require a more than 2 heaters and will be specified accordingly.

PART 2: CONTROL PANEL

The panel will be a powder-coated metal cabinet complete with engraved legends. This will monitor and regulate the various electrical inputs and outputs from the equipment ensuring adequate pre-heating and safe entry of gas to the heaters.

The system will employ an air temperature sensor, which will provide the input to a dual-display temperature controller in the control cabinet, which will display the air temperature within the room/oven and provide the output to the gas flow control manifold. This system will automatically adjust the gas flow to the heaters (working together) and use of their elements to **provide an actual air temperature in the room/oven within +/- 5°C of the control set point** (desired temperature), e.g. 35 degrees C.

At the end of the complete cycle the system will extend an audible/visual alarm to notify the operator that the cure cycle is complete. *All the above mentioned parameters (time, temperature) can be altered by a competent operator to achieve the optimum curing requirements for the coating.*

The panel will have a CAD wiring and termination drawing as standard. **The control panel will be capable of controlling an air movement system described in section 5 below.**

The panel will be supplied with 1 off type-K thermocouple and pair of male and female mini couplers for type-k thermocouple extension wire, supplied loose complete with 6 meters of suitable thermocouple extension cable.

Note : Control panels for a larger number of heaters and/or control zones will be specified on request.

PART 3: HEATER FITTINGS

Electrical fittings, Per heater:

1 off Explosionproof brass reducing bush
2 off Explosionproof brass gland
1 off Pair of 45 degree angle wall mounting brackets, galvanised

Gas fittings, Per heater:

2 off 1/2" union-MxF
1 off 1/2" tee with ½" x 1/8" reducing bush and 1/8" brass pressure test point
1 off Gas connector hose (1/2 " B.S.P .x 1 m, **stainless steel**)
1 off suitable G.B. approved manual isolating lever ball valve
2 off nipples ½"
1 off brass trimming valve, ½"

PART 4: GAS CONTROL MANIFOLD

One off fully assembled gas control manifold for use with the control cabinet, incorporating main solenoid valve and high and low running solenoids for temperature control, manual isolator valves, trimming valve and pressure test points as required. The manifold will be made in ½" pipe and ready to connect into a suitable gas supply within 3 meters.

The system will require:

69 cubic feet per hour of NATURAL GAS at a pressure of 3 ½" W.C.at the heaters OR
1.96 cubic meters per hour of NATURAL GAS at a pressure of 9 mbar at the heaters

OR

29 cubic feet per hour of PROPANE gas at a pressure of 11" W.C.at the heaters OR
1.96 cubic meters per hour of PROPANE gas at a pressure of 28 mbar at the heaters

Note : Systems involving a larger number of heaters and/or bigger heaters may require a larger manifold which will be specified on request.

PART 5 : AIR-MOVEMENT SYSTEM (OPTIONAL)

To **supply only** (in component form, for self assembly and self-erection) one air movement system using self coloured spiral wound galvanised ducting.

There will be a re-circulation and extraction system. The extraction system will be complete with a filtered air intake. During one complete curing cycle, the system would complete a "Drying phase" and a "Purge Phase".

Drying phase (Approx. 30 minutes)

During the drying phase, the re-circulation system would capture hot air (generated by convection currents over the surface of the catalytic panels and re-radiation from the substrate). The air will then be re-introduced and re-circulated around the oven and over the catalytic heaters where solvent vapours will be oxidised . During the drying phase the system,, which is controlled via belimos (motorised air dampers), will still bleed approx. 30% to extract.

Purge phase (e.g. 5 minutes)

At the end of the "Drying Phase" the "Purge Phase" will commence, i.e. the re-circulation belimo will close and the extract belimo will open fully allowing the extract system to purge 100% of the air out of the oven via ducting from low level.

At the end of this "Purge Phase" the control system will extend an audible/visual alarm to notify the operator that the cure cycle is complete.

There will also be an override switch that will switch off the "drying" and "purge" timers and leave the oven constantly in "drying mode

Note : The price below is for a room or enclosure approx. 3-m long x 2-m wide x 2-m tall. Larger rooms/enclosures may require a more powerful fan and larger ductwork and will be specified on request.

PART 6: CABLE

Circular flexible cable, 0.75 mm x 3 core, heat resistant to 180 degrees C , £ 1 per meter
Circular flexible cable 2.5 mm x 3 core, heat resistant to 180 degrees C, £ 2.00 per meter
Type-k thermocouple extension wire, flat, P.V.C. insulated, unscreened £ 1.25 per meter

All prices are F.O.B. Knypersley and exclude V.A.T.

Exclusions

Any items not specifically included are excluded from the quotation. However, in the interest of clarity the following items are **specifically excluded.**

Installation
Pipe
Any extraction to the exterior of the building
Any interconnecting pipe-fittings necessary for the pipe run,(if any) to the oven
Any trunking or trunking- fittings or cable tray, cable ties.

TOTAL GAS CONSUMPTION

*Note : The gas consumption below is calculated on **a worst case basis**, i..e on running the system on full output all the time. In fact, because the system will modulate between high and low output in order to maintain the desired temperature, in most cases the system will only be run on full output approx. one third of the time.*

2 heaters at 43,200 Btu/hour = 86,400 Btu/hour

Natural (Mains) Gas

The price of natural gas is usually given in pence per Therm or pence per Kilowatt**. You need to find this out from your gas company.**

2 off 12"x 72" heaters at 36,000 Btu = 72,000 Btu per hour

1 Therm = 100,000 Btu per hour, **therefor consumption is 0.72 Therms per hour**

Alternatively, In Kilowatts:

1 kW = 3,412 Btu/hour. Therefor

$$\frac{\text{72,000 Btu per hour}}{\text{3,412 Btu/hour per kW}} = 21.1 \text{ kW.}$$ ***Therefor, consumption is 21.1 kW***

For example : **21.1 kW** @ 4 pence per kW hour = **£ 0.84 per hour**

RUNNING COSTS ARE BASED ON A NATURAL GAS TARIFF OF 4 PENCE PER kW HOUR WHICH IS A LIGHT INDUSTRIAL TARIFF FROM E-ON (POWERGEN) CURRENT AT SEPTEMBER 2008. IT IS FOR ILLUSTRATION ONLY AS GAS PRICES VARY OVER TIME, ACCORDING TO THE VOLUME USED AND ACCORDING TO LOCAL MARKET CONDITIONS. DISCOUNTS ARE AVAILABLE FOR CUSTOMERS WITH LARGER USAGE.

Propane (Bottled or Tank) Gas

If natural mains gas is unavailable the system can be run on Propane gas, e.g. from 47 Kg bottles.

1 Kg of Propane contains 47,500 Btu, therefor consumption is:

$$\frac{\text{72,000 Btu per hour}}{\text{47,500 Btu per Kg}} = \textbf{1.52 Kg of Propane per hour}$$

If the system were run flat out (see note, above) one pair of 47 Kg bottles would last just over 62 hours.

Example 1, based on *list* price of bottled propane (£1.08 per Kg)
1.52Kg per hour @ £1.08 per Kg = **£ 1.64 per hour**

Trade customers may be able to negotiate significant (25%) reductions from propane suppliers' list prices, therefor :

Example 2, based on *discounted* price of bottled propane (£0.81 per Kg)
1.52Kg per hour @ £0.81 per Kg = **£ 1.23 per hour**

Bulk propane from a tank is available at even lower cost. (You may *need to get a quotation* from your supplier taking the following hourly consumption figures as your starting point)

1 litre of liquid Propane contains = 24,356 Btu, therefor consumption is:

$$\frac{\text{72,000 Btu per hour}}{\text{24,356 Btu per litre}} = \textbf{2.96 Litre of liquid Propane per hour}$$

TERMS & CONDITIONS

While this specification is at time of writing, T.C.S. reserve the right to alter this standard specification at any time prior to order. Actual specifications will need to be confirmed at time of order. Please contact us for current pricing or a quotation to suit your needs.

For information only, our standard terms are as follows:

The Bruest catalyst pads are guaranteed for **5** years. The standard manufacturers' warranties and guarantees will apply to all other components.

Assumed: free use of site services, customer's forklift truck.

Payment terms : 35 % with order, 25 % on advice of readiness for delivery, 30 % on delivery, 10% due 30 days after delivery

Delivery : **1-5 weeks** from receipt of written purchase order and mobilisation deposit subject to confirmation.

VAT: Where appropriate**,** VAT will be added to all the above invoices at the rate ruling applied at date of invoice.

EXCLUSIONS:

Clearance of any existing equipment
Supply of mains electric, gas, air or water
Any necessary building works or roof work in the area
Off loading of goods
Supply or provision of any equipment, support structure, services etc other than those specified within our quotation
Supply of specialist access equipment required

TERMS:

Unless otherwise agreed in writing, the proposal notes and terms and conditions located at the rear of this document shall apply to any order placed by the customer. In the event of any inconsistency between these terms and those passing between the parties these terms shall prevail. No variation of the term and conditions shall be allowed unless expressly accepted in writing.

Yours sincerely, for Thermo Catalytic Systems Ltd.

David Miller (E. & O.E.)